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Hishida

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(54) **SNOW-PLOWING APPARATUS**

(75) Inventor: **Tadashi Hishida**, Sakai (JP)

(73) Assignee: **VIV Engineering Inc.**, Sakai-shi (JP)

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(58) **Field of Classification Search** 37/241–244, 37/248, 265; 56/12.7
See application file for complete search history.

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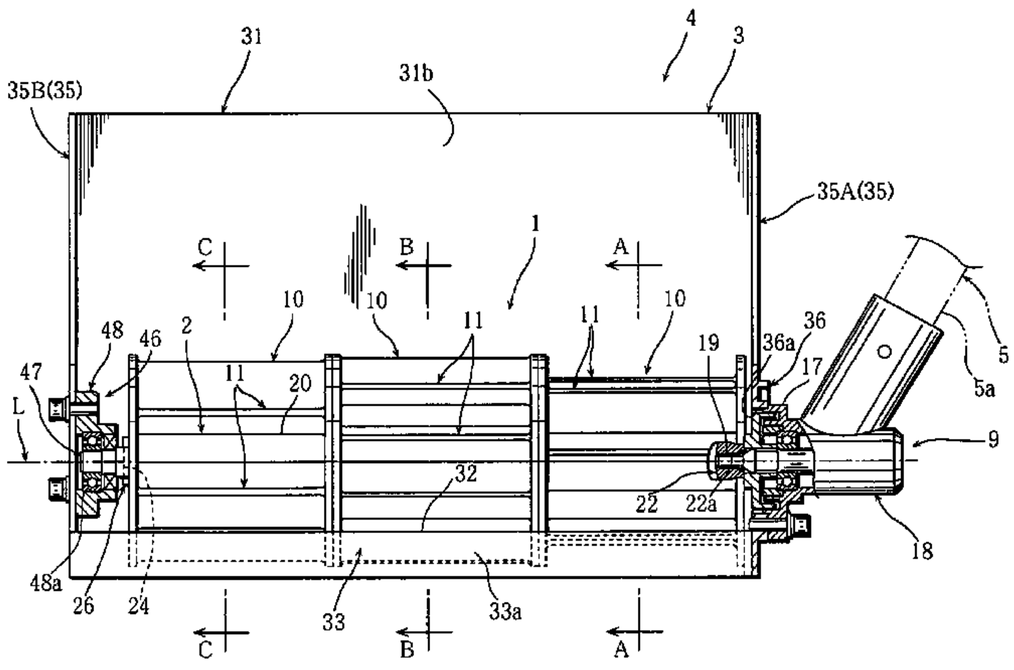
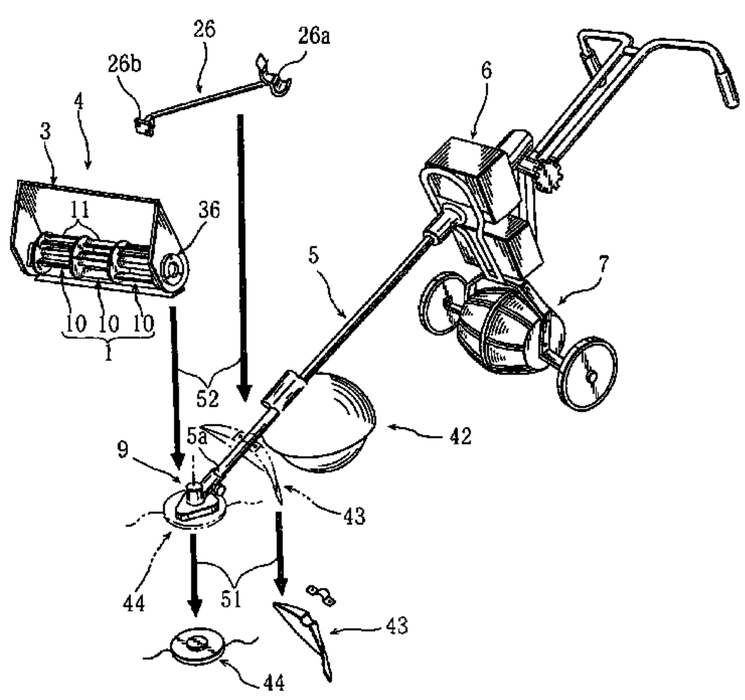
Primary Examiner—Thomas A Beach
(74) *Attorney, Agent, or Firm*—Kratz, Quintos & Hanson, LLP

(57) **ABSTRACT**

A snow-plowing apparatus provided with a snow-removing member detachably attached to an end of a holding rod of a hand-pushed mower, in which an engine and a wheel are attached to a frame, having a detachable rotation transmitting portion, to which a mowing blade is attached and rotational driving force of an engine is transmitted, on the end of the holding rod extending from the engine forward and downward. The snow-removing member is provided with a snowplow rotating body rotated around a horizontal axis through the rotation transmitting portion to plow and shoot the snow. The snowplow rotating body is composed of three short rotating bodies. Each of the short rotating bodies has four snow-plowing blades disposed in peripheral direction with a predetermined pitch. And, the snowplow rotating body is composed of the three short rotating bodies mounted on a shaft body as the snow-plowing blades are dislocated one another in the peripheral direction.

8 Claims, 11 Drawing Sheets





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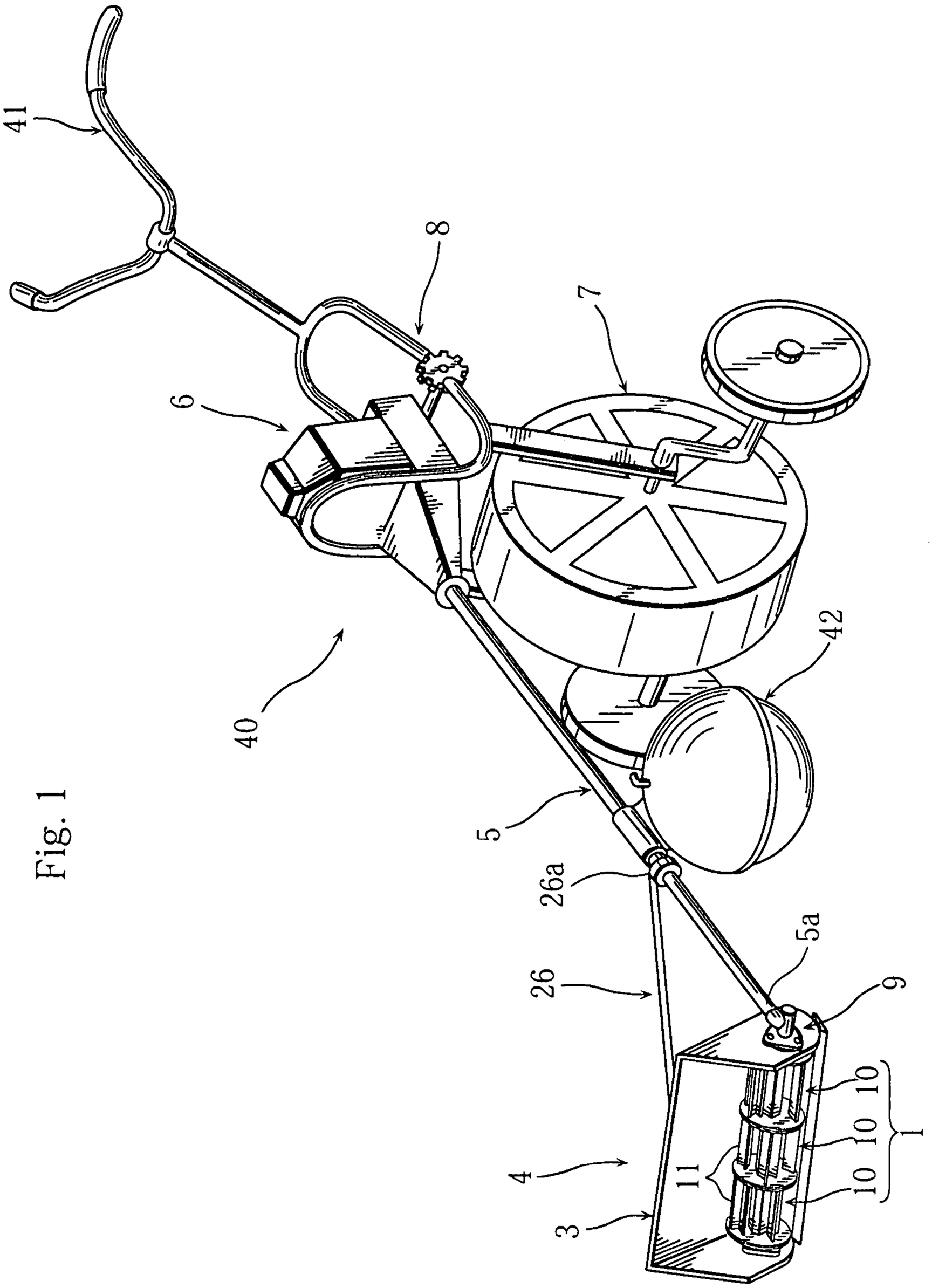
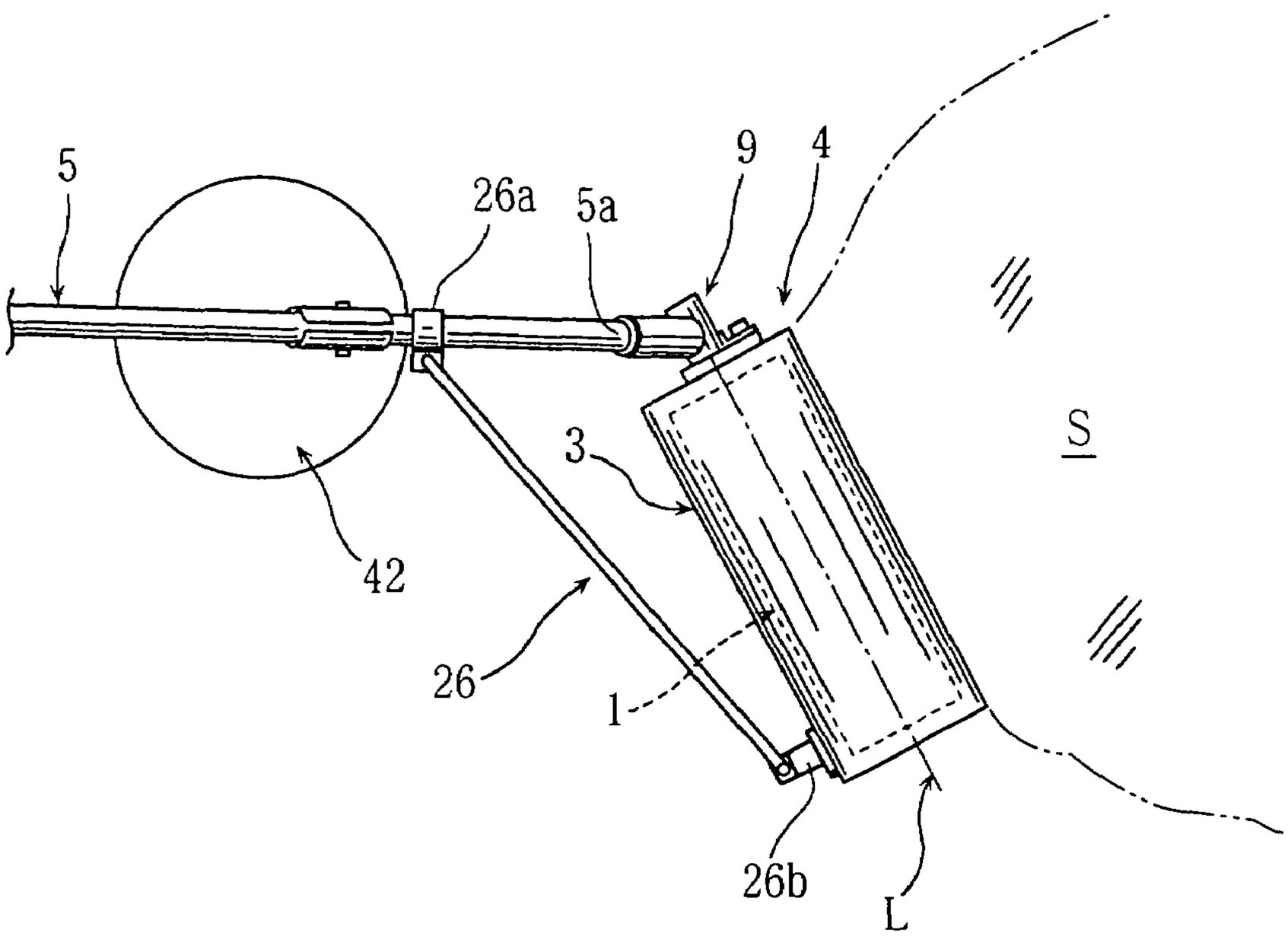
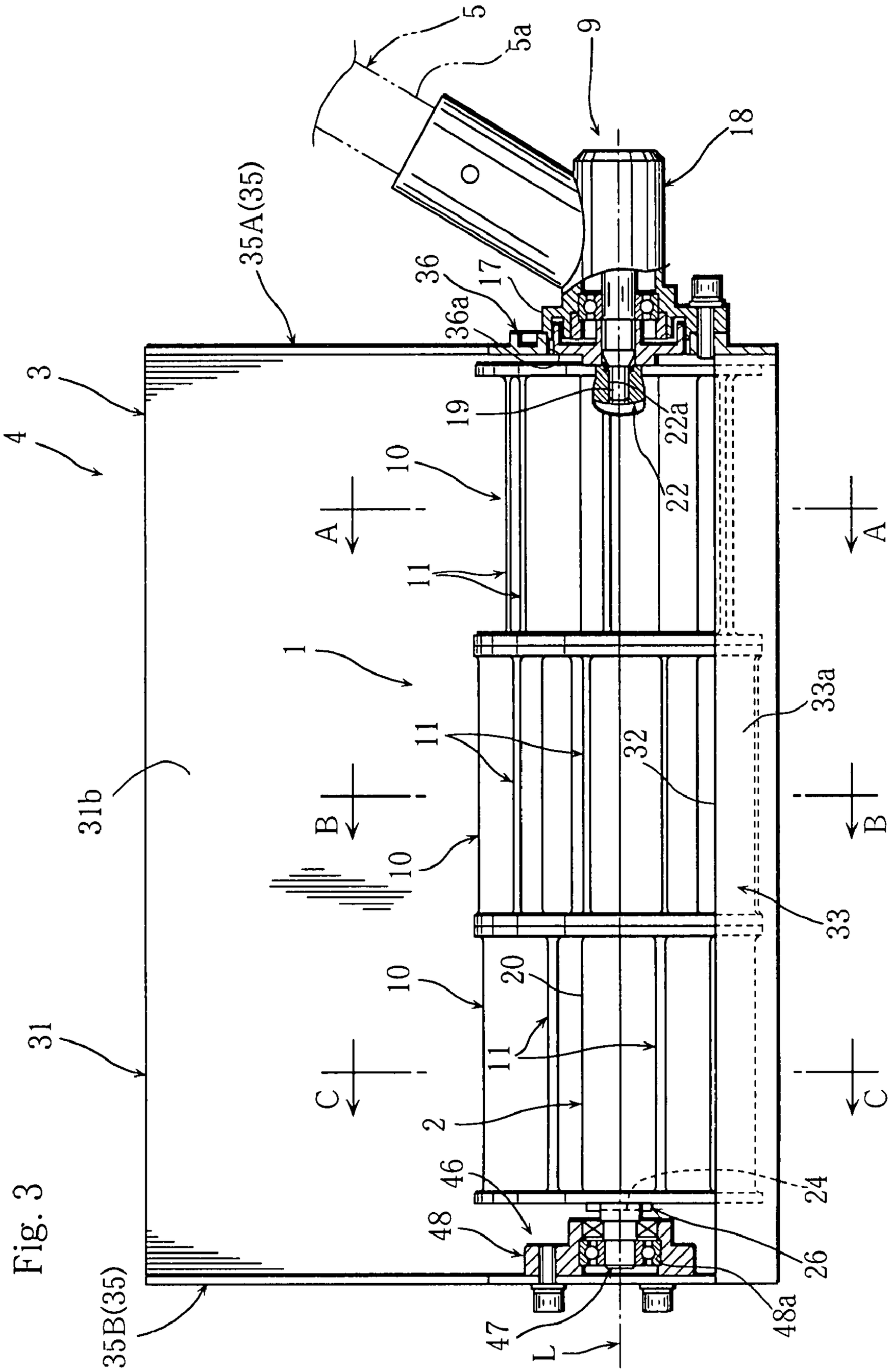


Fig. 1

Fig. 2

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5a
9
18
35A(35)
36
36a
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3
4
19
22a
22
10
A
11
1
B
11
32
33a
33
10
31b
20
10
11
C
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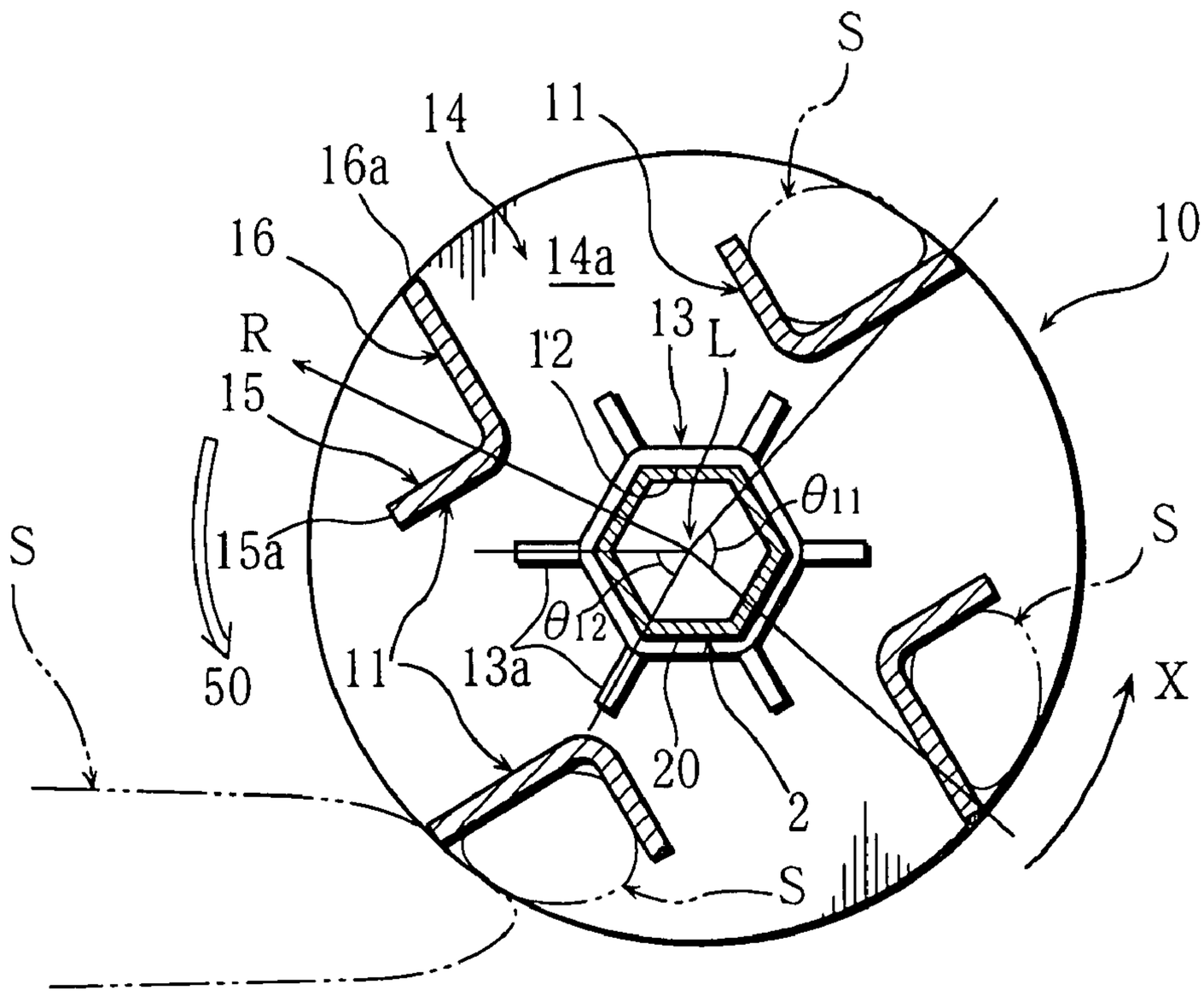
46
24
48
26
48a
47
L
31
35B(35)

Fig. 3

Fig. 4


S
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11
16a
16
14a
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13
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θ_{11}
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13a
X
20
2
S

Fig. 5

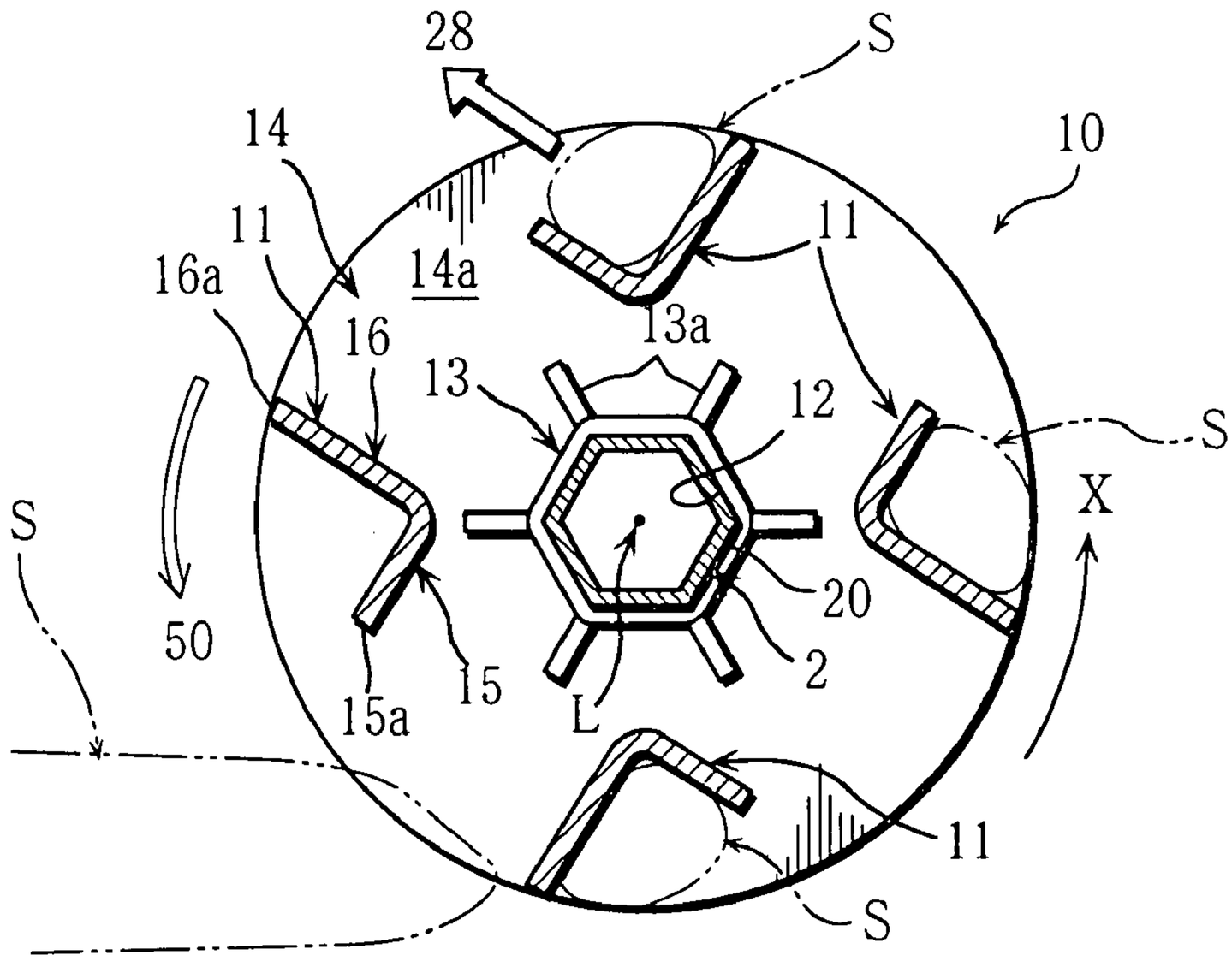
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Fig. 6

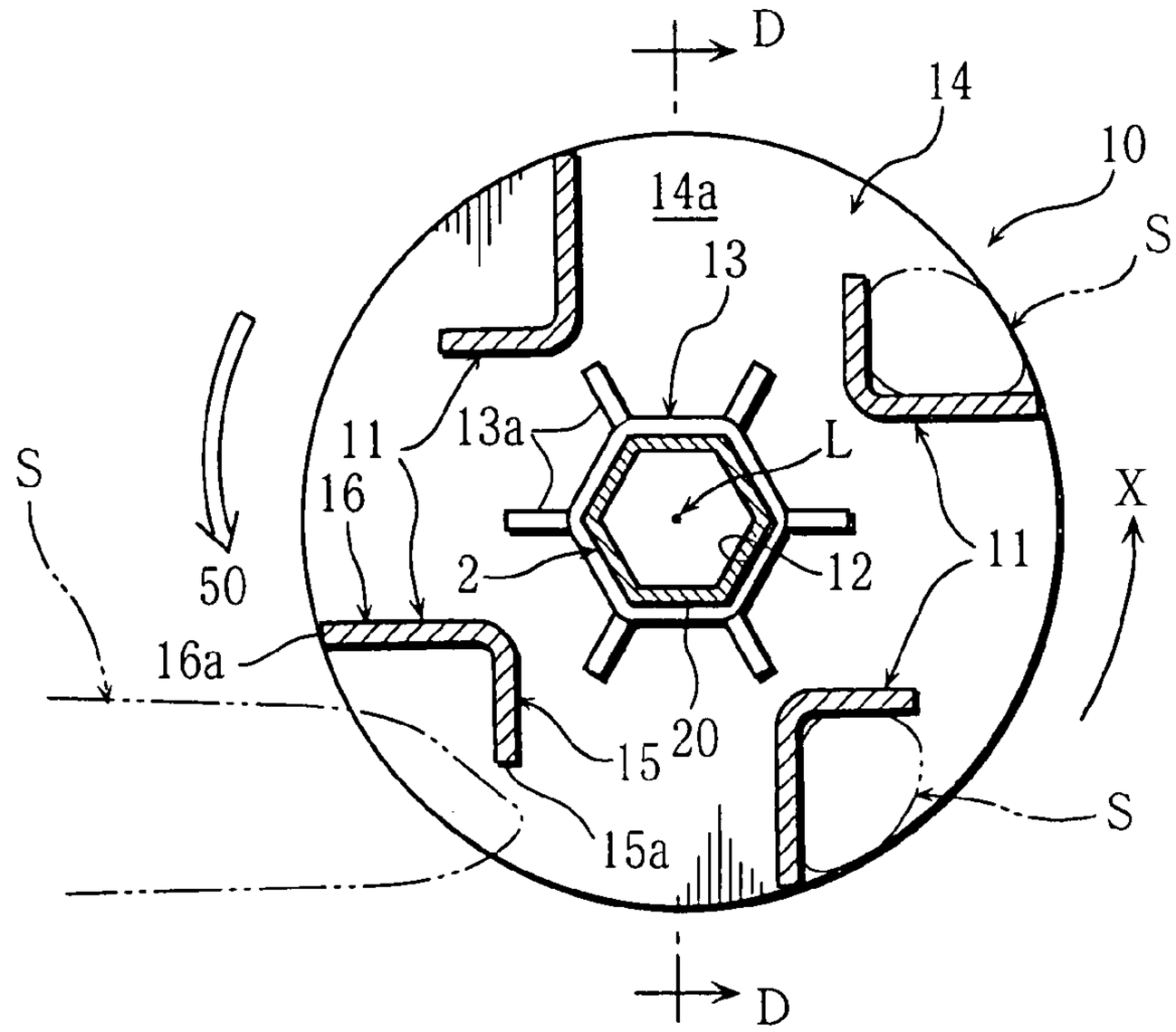
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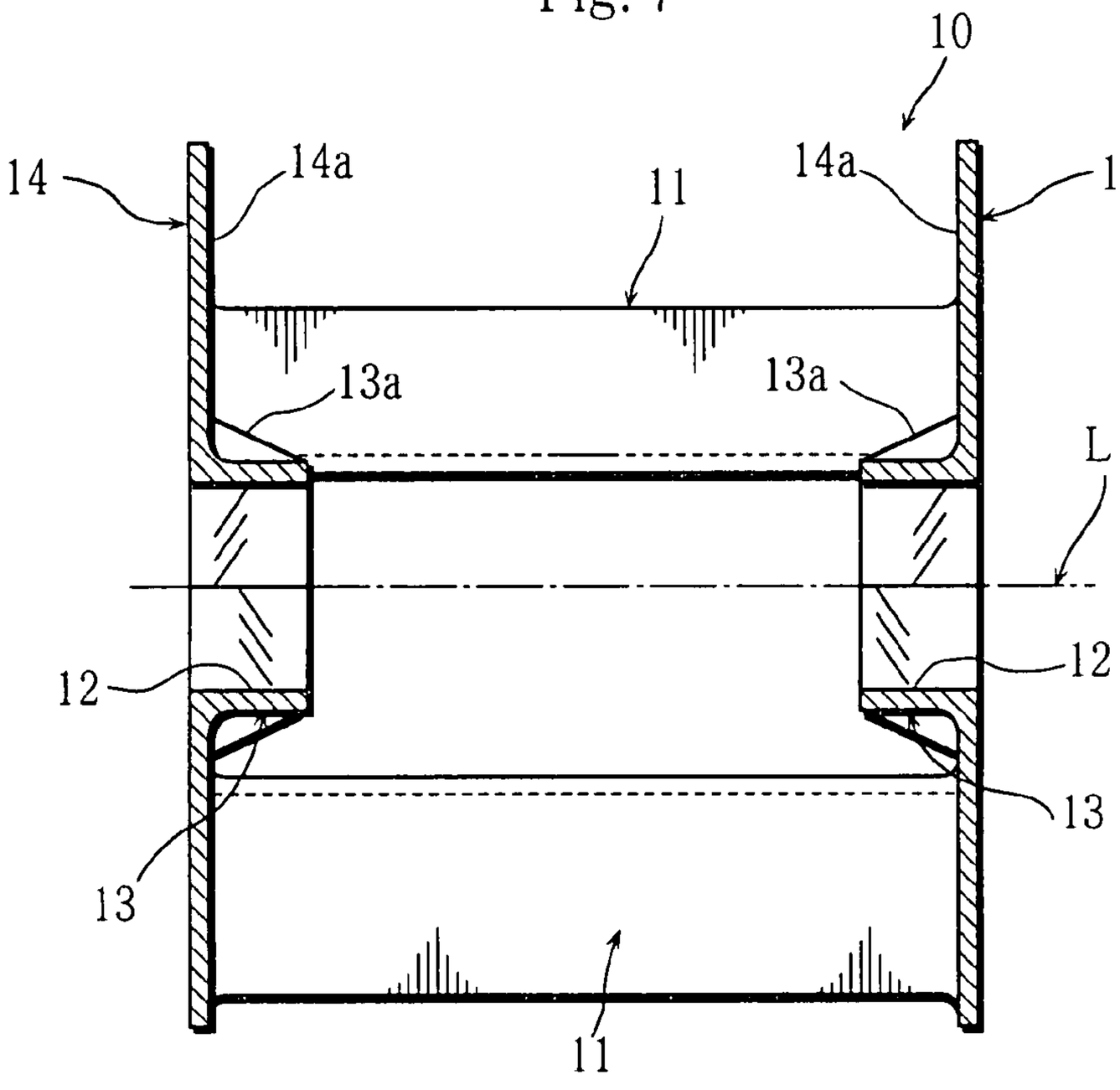
Fig. 7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13
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Fig. 8

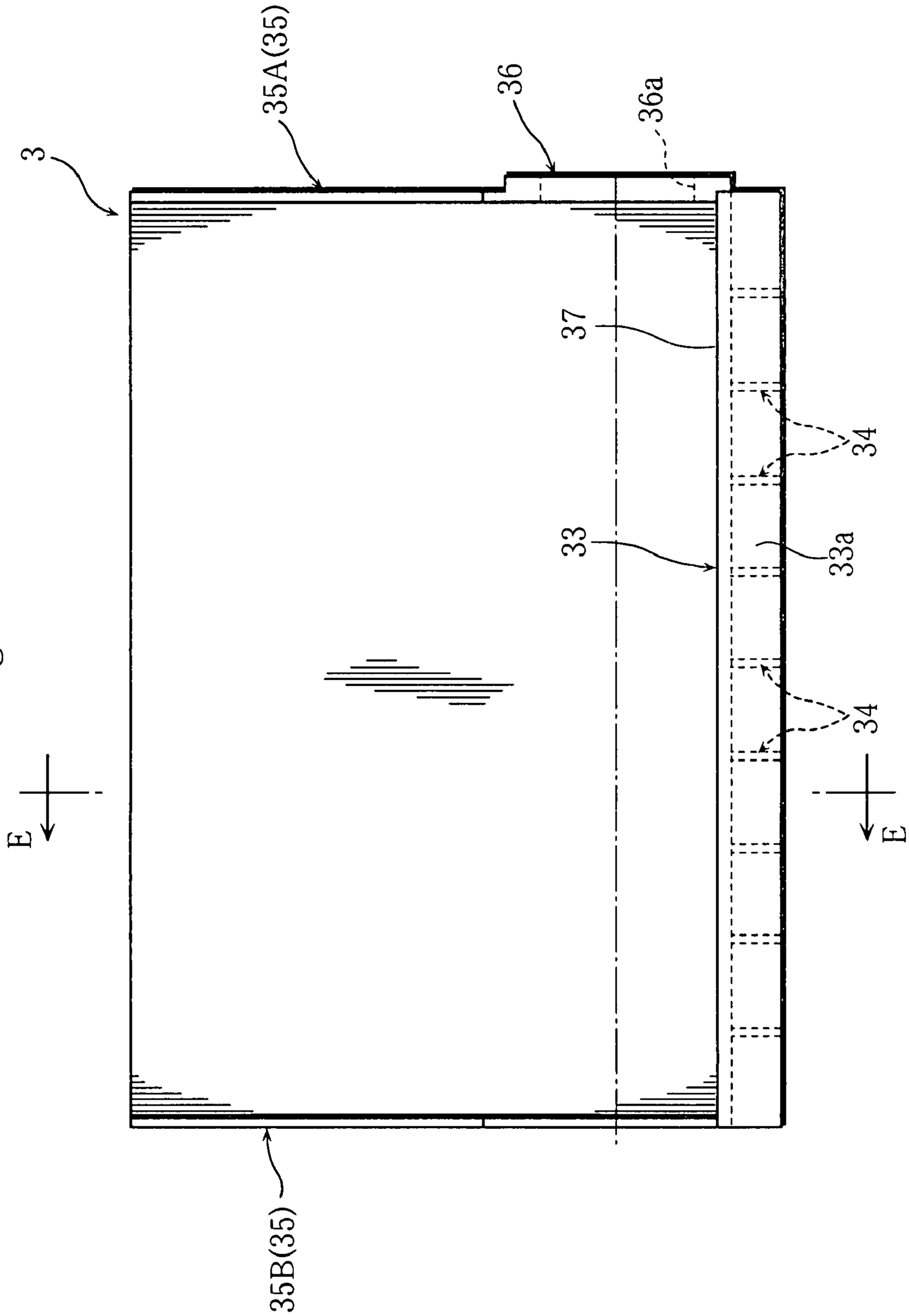


Fig. 9

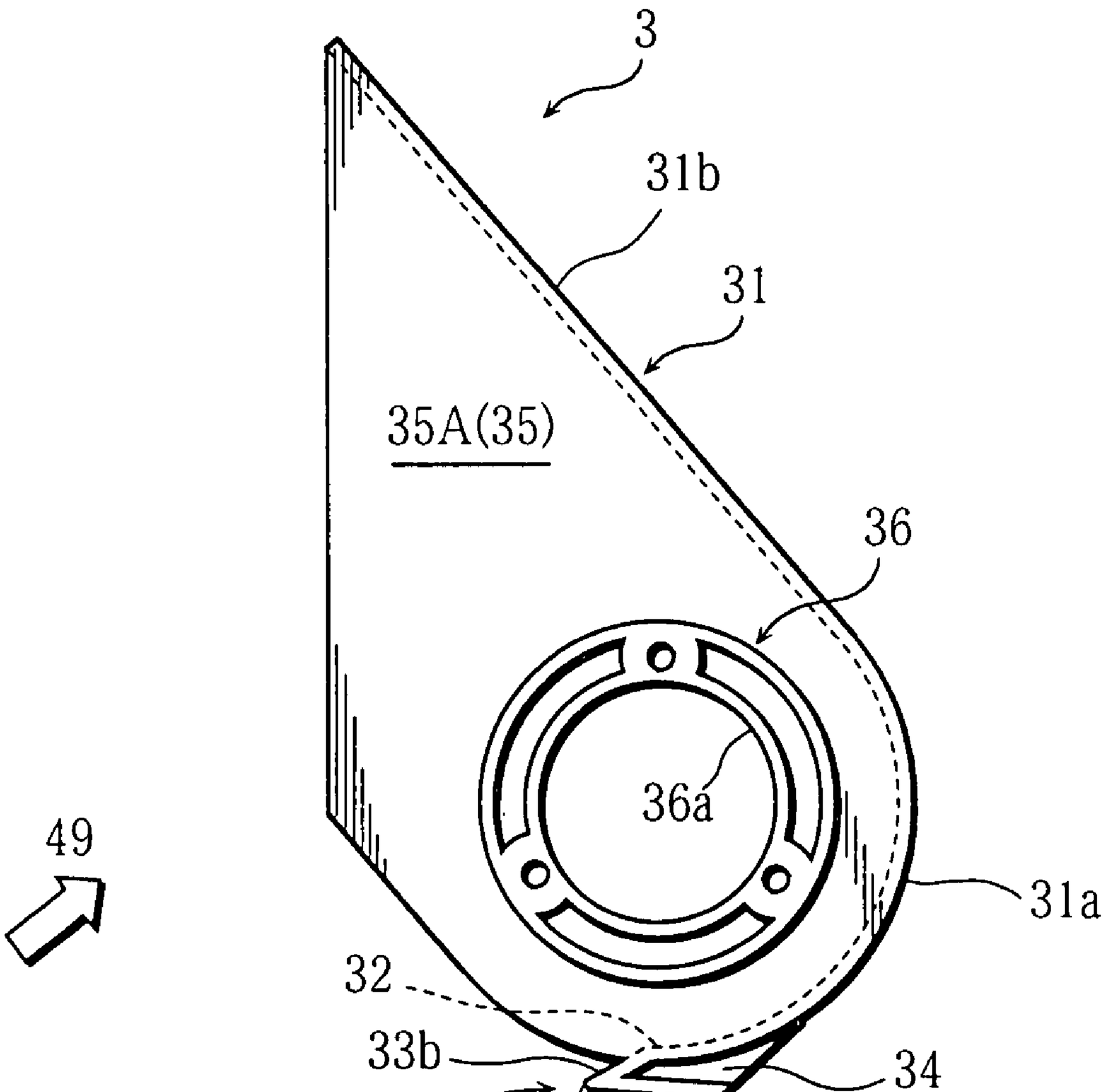


Fig. 10

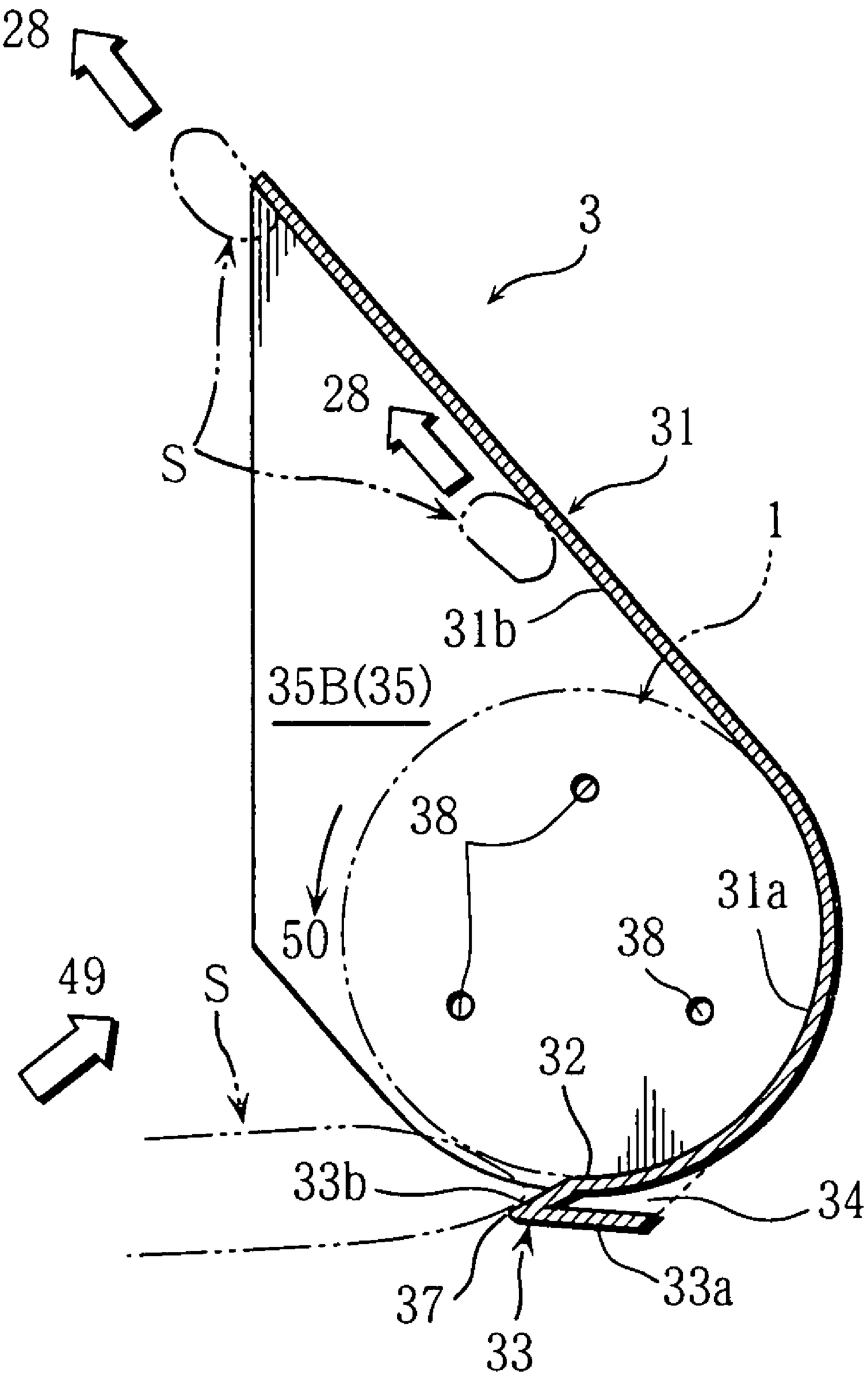


Fig. 11

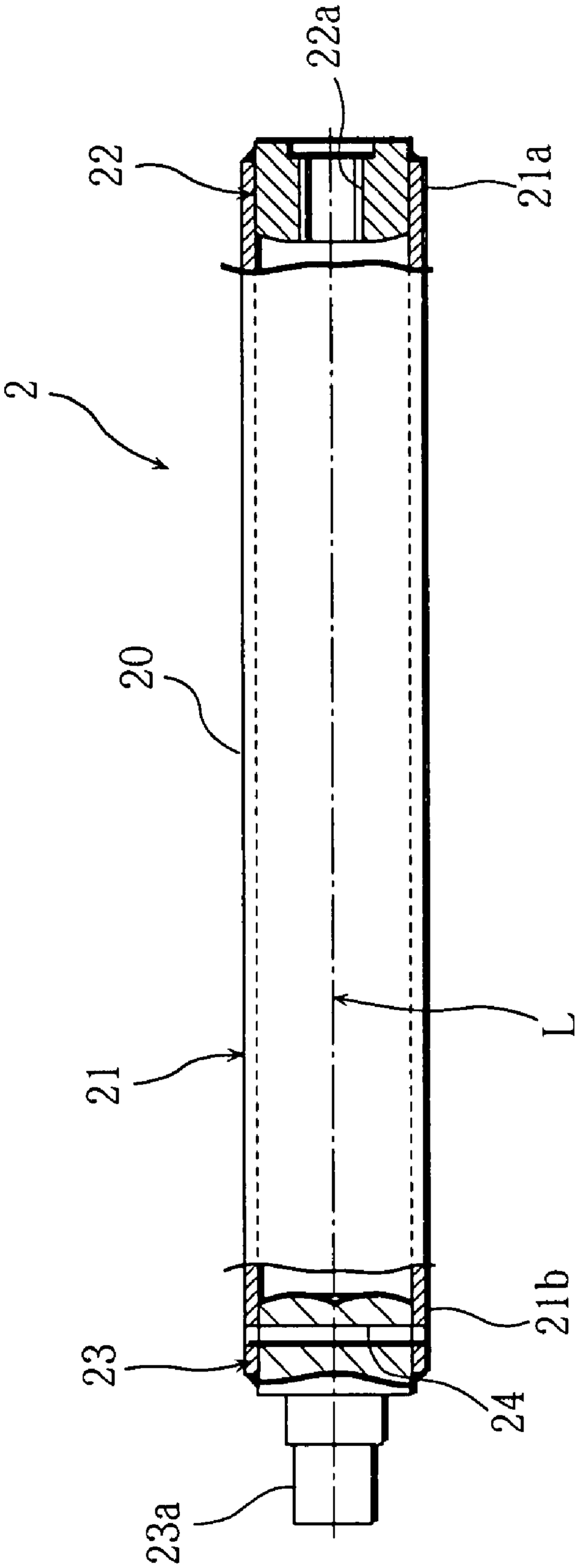
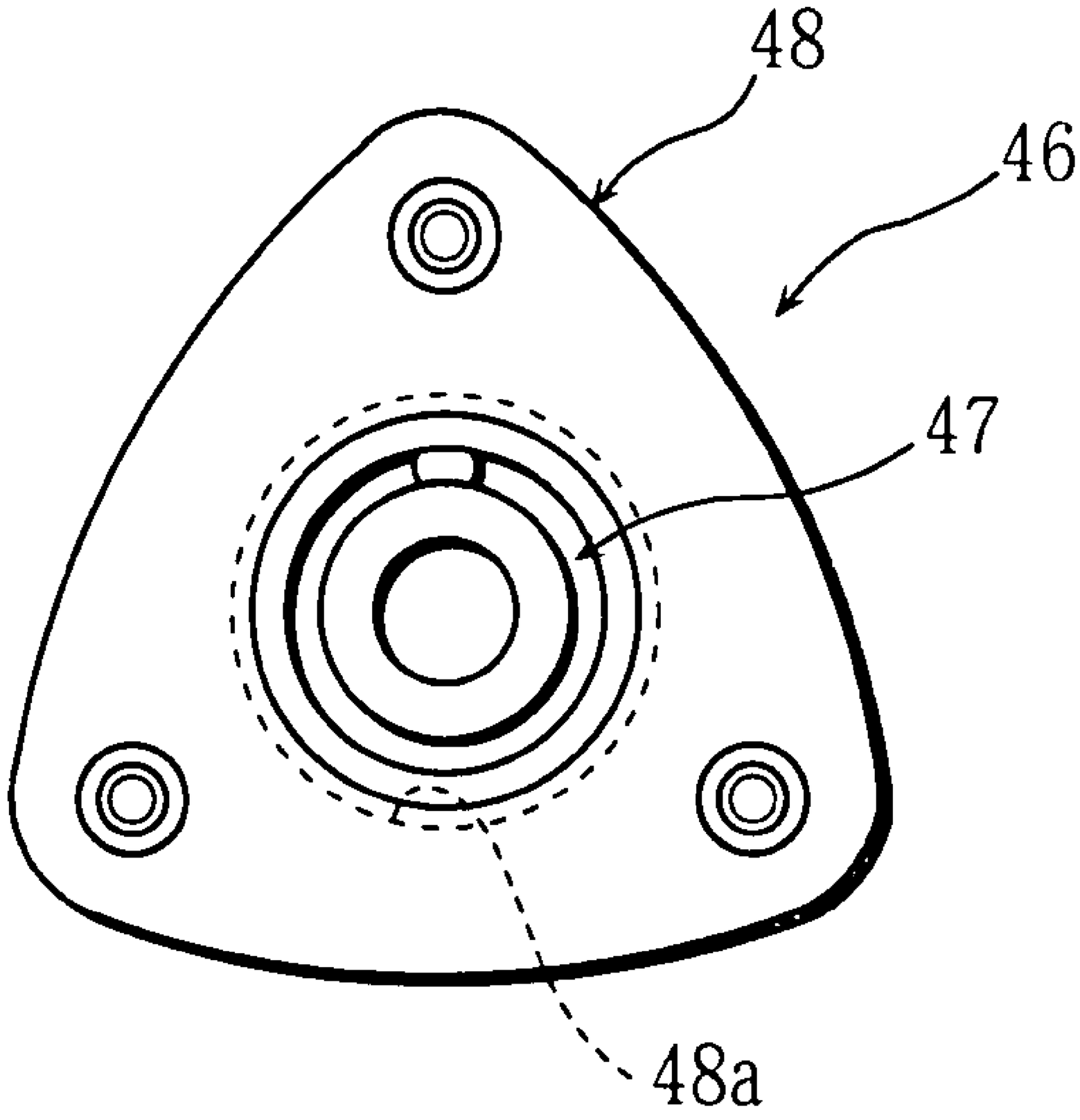


Fig. 12



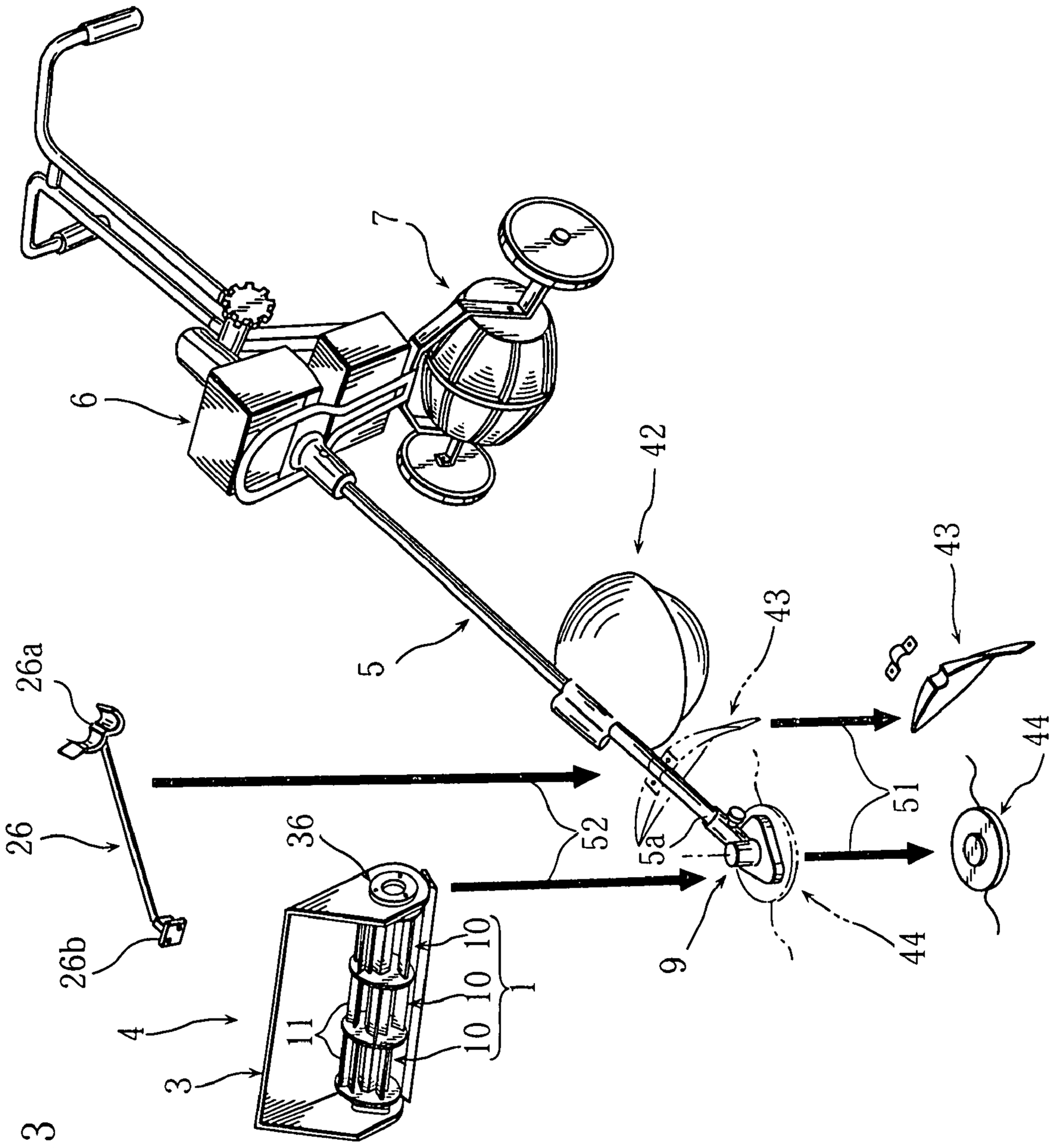


Fig. 13

SNOW-PLOWING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a snow-plowing apparatus.

2. Description of the Related Art

In a conventional snow-plowing apparatus, a housing opening forward for snow shooting is attached to a front part of a body on which an engine is mounted, an auger for gathering snow rotated around a horizontal axis by rotational driving force of the engine is disposed in front of the housing as to be surrounded, and a blower to blow away the snow gathered on a center portion by the rotation of the auger through a chute is provided (refer to Japanese Patent Provisional Publication No. 2005-226336 for example).

In this conventional snow-plowing apparatus, very high torque is loaded to a shaft connected to the engine, very high stress is loaded onto the engine, and defects tend to be generated because the gathering work of the snow on the center portion by the auger and the snow shooting work by the blower are simultaneously conducted by rotating both of the auger and the blower by the driving force of one engine. And, cost is caused because a high-power engine is necessary. Further, this snow-plowing apparatus is exclusively for snow-plowing and the apparatus including the engine can not be utilized in other seasons than winter.

It is therefore an object of the present invention to provide a snow-plowing apparatus which can plow the snow without high stress on the engine, and by use of a machine for other purposes than snow-plowing.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be described with reference to the accompanying drawings in which:

FIG. **1** is a perspective view showing an embodiment of a snow-plowing apparatus relating to the present invention;

FIG. **2** is a top view of a principal portion;

FIG. **3** is a front view of a principal portion;

FIG. **4** is a cross-sectional view at A-A line of FIG. **3**;

FIG. **5** is a cross-sectional view at B-B line of FIG. **3**;

FIG. **6** is a cross-sectional view at C-C line of FIG. **3**;

FIG. **7** is a cross-sectional view at D-D line of FIG. **6**;

FIG. **8** is a front view showing a housing member;

FIG. **9** is a side view showing the housing member;

FIG. **10** is a cross-sectional view at E-E line of FIG. **8**;

FIG. **11** is a side view with partial cross section showing a shaft member;

FIG. **12** is a front view showing a bearing member; and

FIG. **13** is an explanatory perspective view showing another embodiment of the snow-plowing apparatus relating to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will now be described with reference to the accompanying drawings.

As shown in FIG. **1** through FIG. **3**, an embodiment of snow-plowing apparatus relating to the present invention is provided with a snow-removing member **4** attached to a hand-pushed mower **40** for mowing grass instead of a mowing blade.

In the hand-pushed mower **40**, an engine **6** and a wheel **7** are attached to a frame **8**, rotational driving force of the engine **6** is transmitted to an end **5***a* of a holding rod **5** extended from

the engine **6** forward and downward, and a rotation transmitting portion **9**, to which a mowing blade is detachably attached, is provided. The rotation transmitting portion **9** has a gear case **18** disposed on the end **5***a* of the holding rod **5**, a gear in the gear case **18** is connected to the engine **6** with a driving shaft disposed within the holding rod **5** as to freely rotate, and a rotation shaft portion **19** is protruding from an attachment disc portion **17** of the gear case **18**. And, a mark **42** represents a spherical blade height adjuster attached to the middle of the holding rod **5** to keep a certain height of the mowing blade.

In case that the apparatus is used as the hand-pushed mower **40** for mowing grass, a rotational axis of the rotation shaft portion **19** is directed approximately vertical and the mowing blade is attached (not shown in Figures). FIG. **1** shows a state in which the mowing blade is detached from the rotation transmitting portion **9**, the rotational axis of the rotation shaft portion **19** is set to be in a horizontal axis L direction, and the snow-removing member **4** is attached to the rotation transmitting portion **9**.

Next, the snow-removing member **4** is described. The snow-removing member **4** is provided with a shaft member **2** attached to the rotation shaft portion **19** of the rotation transmitting portion **9** to rotate around the horizontal axis L, a snowplow rotating body **1** rotated around the horizontal axis L through the rotation transmitting portion **9** (mounted onto the shaft member **2**) to plow the snow, and a housing member **3** attached to the end **5***a* of the holding rod **5** and disposed near the snowplow rotating body **1** on the rear side to guide the plowed snow as to be thrown away upward.

In FIGS. **3** through **6** and FIG. **11**, the shaft member **2** has a pipe member **21** of equilateral hexagonal cylinder, an attachment end member **22** fit to an end **21***a* of the pipe member **21** and having a female screw hole **22***a* to which the rotation shaft portion **19** of the rotation transmitting portion **9** is screwed, and a shaft end member **23** fit to another end **21***b* of the pipe member **21** and having a shaft portion **23***a* protruding in a longitudinal direction (the axis L direction). And, an insertion hole **24** is formed through the end **21***b* of the pipe member **21** and the shaft end member **23** in a diameter direction, the rotating body **1** is prevented from moving in the axis L direction by insertion of a sheer prevention pin **25** into the insertion hole **24** after the snowplow rotating body **1** is mounted to the shaft member **2** (refer to FIG. **3**). A rotating direction **50** of the rotating body **1** and the shaft member **2** is forward direction and anticlockwise when observed from the left side in the axis L direction.

In FIG. **1** and FIGS. **3** through **7**, the snowplow rotating body **1** is composed of three short rotating bodies **10** which unitedly rotate with the shaft member **2** around the horizontal axis L. In other words, the snowplow rotating body **1** is divided into the three short rotating bodies **10** along the axis L direction.

Each of the short rotating bodies **10** has disc portions **14** disposed parallel with a predetermined interval and having insertion holes **12** in the center, short cylinder portions **13** of equilateral hexagonal cylinder bent inward from the insertion holes **12** of the disc portions **14**, and four snow-plowing blades **11** unitedly formed with inner faces **14***a* of the pair of disc portions **14** and disposed in a peripheral direction X with a predetermined pitch. The insertion hole **12** is formed into an equilateral hexagon as to be mounted to the shaft member **2** without gaps. A center angle θ_{11} of equal distribution of the snow-plowing blades **11**, 60° in Figures, and a replacement pitch angle θ_{12} of insertion of the shaft member **2** into the

insertion hole **12** of the short rotating body **10**, 90° in Figures, are set to be different and be in mutual relationship of multiplication by integer.

Each snow-plowing blade **11** has an L-shaped cross-sectional configuration made by bending a band plate and composed of a (front) band plate portion **15** on the front side in the rotating direction **50** and another (rear) band plate portion **16** on the rear side distinguished by the bend. The band plate portion **15** is shorter than the band plate portion **16**, and the band plate portions **15** and **16** are disposed as to open toward a radius direction R. And, an end edge portion **15***a* of the band plate portion **15** is apart from a peripheral edge of the disc portion **14** with a predetermined interval, and another end edge portion **16***a* of the band plate portion **16** is extended as to contact the peripheral edge of the disc portion **14**. With this construction, the band plate portion **16** on the rear side plows the snow S (refer to FIG. **6**) just after the band plate portion **15** on the front side passes without plowing the snow S, and each of the snow-plowing blades **11** certainly catches the snow S. And, plural ribs **13***a* are formed from the periphery of the short cylinder portion **13** to the inner face **14***a* of the disc portion **14** with a predetermined pitch to make the construction of the short rotating body **10** firm.

Then, the three short rotating bodies **10** are mounted to the shaft member **2** as the disc portions **14** are tightly fit each other, and the positions of the snow-plowing blades **11** of the three short rotating bodies **10** are dislocated for 120° in the peripheral direction X one another (refer to FIGS. **3** through **6**).

Next, as shown in FIGS. **8** through **10**, the housing member **3** has a snow-shooting wall portion **31** approximately forward-and-upward-inclined J-shaped in cross section to guide the snow upward, side wall portions **35** of which rear side portions are unitedly formed with side portions of the snow-shooting wall portion **31**, and a snow-shoveling portion **33** unitedly formed with a lower end edge **32** of the snow-shooting wall portion **31**. The snow-shooting wall portion **31** has a forward-and-upward-inclined flat plate portion **31***b* and a curved plate portion **31***a* unitedly extending downward from a lower end of the flat plate portion **31***b*. A side wall portion **35**A, one (on the left side in the embodiment) of the pair of the side wall portions **35** has a fixed ring portion **36** having a (circular) opening portion **36***a* on a lower portion to which the attachment disc portion **17** of the gear case **18** is fixed with a bolt and the rotation shaft portion **19** is inserted. In the fixed ring portion **36**, plural female screw holes for screwing bolts are formed (3 female screw holes in ring with a predetermined pitch, for example) around the opening portion **36***a*. And, plural bolt insertion holes **38** (3 bolt insertion holes in ring with a predetermined pitch, for example) to fix a bearing member **46** described below (refer to FIG. **3** and FIG. **12**) are formed on a lower portion of another side wall portion **35**B (on the right side).

And, the snow-shoveling portion **33** has a shoveling portion **33***b* of band plate protruding forward unitedly with a lower end edge **32** of the snow-shooting wall portion **31**, and a bottom portion **33***a* of band plate formed horizontal unitedly with a front end edge of the shoveling portion **33***b* by bending backward. The shoveling portion **33***b* and the front end edge of the bottom portion **33***a* form a shoveling edge portion **37** of acute angle in cross section. And, plural reinforcing ribs **34** of thin wall, connecting an upper face of the bottom portion **33***a*, a rear face of the shoveling portion **33***b*, and a lower face of the snow-shooting wall portion **31** unitedly, are disposed with a predetermined pitch in lateral direction to make the snow-shoveling portion **33** firm. And, a front side portion of each of the side wall portions **35** is formed vertical in an upper part and formed inclined backward and downward in a lower part (refer to FIG. **9** and FIG. **10**).

The housing member **3** shown in FIG. **3** and FIG. **8** is shown in a direction (of an arrow **49** in FIGS. **9** and **10**) at right angles with the snow-shooting wall portion **31**.

Next, in FIG. **3** and FIG. **12**, the snow-removing member **4** has a bearing member **46** attached to an inner face side of the side wall portion **35**B of the housing member **3** and holding the shaft portion **23***a* of the shaft member **2** as to freely rotate. Concretely, the bearing member **46** has a (radial) bearing **47** having an inner ring to which the shaft portion **23***a* of the shaft member **2** is fit, and a bearing main body **48** having a hole **48***a* to which an outer ring of the bearing **47** is fit. The bearing main body has an approximately triangular configuration, and female screw holes corresponding to the bolt insertion holes **38** on the right side wall portion **35**B of the housing member **3**. And, the bearing main body **48** is attached to the inner face of the side wall portion **35**B with bolts. The shaft member **2** smoothly rotates without staggering of the axis and snow plowing work is smoothly conducted because one side of the shaft member **2** is held by the bearing member **46** as to freely rotate.

And, in FIG. **1** and FIG. **2**, a mark **26** represents a fixing rod portion of which end **26***a* and another end **26***b* are detachably attached to the holding rod **5** and rear portion of the housing member **3** respectively to fix the direction of the snow-removing member **4**. The end **26***a* is, for example, composed of an attachment portion opened and closed by a hinge to surround the holding rod **5** and fix with screws, and the other end **26***b* is composed of an attachment piece attached to and detached from the rear face of the housing member **3** with screws.

FIG. **13** shows another embodiment of the snow-plowing apparatus relating to the present invention. The wheel **7**, different from that of FIG. **1**, has a small hollow barrel (shell construction) formed by blow molding of similar size to the blade height adjuster **42**. The wheel **7** of the mower **40** in FIG. **1** is formed into a tire having diameter larger than the blade height adjuster **42**, and, although not shown in Figures, anti-skid concavo-convex may be formed on the tread. And, a pair of auxiliary wheels are disposed on the both sides of the wheel **7** in both apparatuses in FIG. **1** and FIG. **13**.

And, in case that the hand-pushed mower **40** is used for mowing grass in FIG. **13**, the blade height adjuster **42** and a guard member **43** are attached to the holding rod **5**, and a mowing blade **44** is attached to a rotation shaft portion (not shown in FIG. **13**) of the rotation transmitting portion **9** directed vertical (the state shown with two-dot broken lines). The guard member **43**, detachably attached to the holding rod **5** in front of the blade height adjuster **42**, prevents grass from jumping toward the user.

Next, in case that the mower **40** is used for snow-plowing, the guard member **43** and the mowing blade **44** are removed from the holding rod **5** and the rotation transmitting portion **9** (refer to arrows **51**), the rotation shaft portion of the rotation transmitting portion **9** is directed horizontal, and the fixing rod portion **26** and the snow-removing member **4** are attached to the rotation transmitting portion **9** (refer to arrows **52**).

In the hand-pushed mower **40** in FIG. **1**, the guard member and the mowing blade are also attached to the holding rod **5** and the rotation transmitting portion **9** when used for mowing grass (not shown in Figures), replacement is conducted in similar manner to the above-described process in FIG. **13** when used for snow-plowing.

Then, when the engine **6** of the hand-pushed mower **40** is started in FIGS. **1** through **6** and FIG. **10**, the shaft member **2** and the snowplow rotating body **1**, connected to the rotation

shaft portion **19** of the rotation transmitting portion **9**, are rotated forward around the horizontal axis L as shown with the arrow **50**. And, when the user holds the handle **41** and move the mower **40** forward, the shoveling edge portion **37** of the snow-shoveling portion **33** shovels the snow S on the ground, the shoveled snow S slides up along the forward-inclined shoveling portion **33***b*, and the snow S is smoothly sent to the snowplow rotating body **1**.

And, as described above, the three short rotating bodies **10** forming the snowplow rotating body **1** unitedly rotate keeping the state that the snow-plowing blades **11** of each short rotating body **10** are dislocated for 120° in the peripheral direction X each other (refer to FIG. **4** through FIG. **6**), and the snow-plowing blades **11** of all of the short rotating bodies **10** do not plow the snow S simultaneously because timing of plowing the snow S by each snow-plowing blade **11** differs for a 120° cycle in the short rotating bodies **10** respectively. Therefore, the torque that the shaft member **2** and the short rotating bodies **10** receive in plowing the snow S is about one third of the torque when the snow-plowing blades **11** plow the snow S for the whole length in the axis direction, and stress on the engine **6** is greatly reduced thereby.

And, being different from an electric snowplow, plowing work is possible in a place where an electric cord is not available. Further, the snow-removing member **4** does not need a gearbox and number of parts is reduced because rotation number of the snowplow rotating body **1** can be changed by changing the rotation speed of the engine.

And, the snow S, shoveled by the snow-plowing blade **11**, is held on the snow-plowing blade **11** by the curved plate portion **31***a* when the snow-plowing blade **11** is on a position corresponding to the curved plate portion **31***a* of the snow-shooting wall portion **31** of the housing member **3**, and the snow S, sliding along the front face of the flat plate portion **31***b* of the snow-shooting wall portion **31**, is thrown in the forward-and-upward-inclined direction when the snow-plowing blade **11** reaches near a top portion (refer to an arrow **28** in FIG. **10**). And, the snow is not scattered on both sides of the apparatus by guard of the both side wall portions **35**. As described above, the snow is guided along the forward-and-upward-inclined direction and thrown away by the housing member **3**.

The snow-removing member **4**, although attached to be directed slightly to the left side in FIG. **1** and FIG. **2**, can be modified to be directed slightly to the right side or to face the front side. And, the snow-removing member **4**, although composed as the rotation transmitting portion **9** is attached to the left side wall portion **35**A of the housing member **3**, may be composed as the rotation transmitting portion **9** is attached to the right side wall portion **35**B as to make the whole construction of the snow-removing member **4** reverse (not shown in Figures).

And, the snowplow rotating body **1**, although composed of three short rotating bodies **10** in the present invention, may be composed 4 or more short rotating bodies **10** as to correspond to the length of the snowplow rotating body **1**.

And, although the mowing blade of the hand-pushed mower **40** is replaced with the snow-removing member **4** in the present invention, a hand-pushed snowplow having the snow-removing member **4** as in the present invention may be produced. That is to say, in this snowplow, the engine **6** and the wheel **7** are attached to the frame **8**, and the snow-removing member **4** is attached to the end **5***a* of the holding rod **5** extended from the engine **6** in a forward-and-downward-inclining direction

And, in FIG. **1** and FIG. **13**, the snow is efficiently plowed with a broad width like sweeping of a broom because the end **5***a* of the holding rod **5** can be swung broadly and lightly not only forward and backward but also left and right because of the blade height adjuster **42** attached to the mower **40**.

As described above, one unit of the hand-pushed mower **40** can be used for grass mowing in summer and for snow plowing in winter by replacement of the mowing blade attached to the rotation transmitting portion **9** with the snow-removing member **4**, and the hand-pushed machine having the engine **6** and the wheel **7** is effectively used for many purposes because the snow-plowing apparatus relating to the present invention has a construction in which the snow-removing member **4**, detachably attached to the end **5***a* of the holding rod **5**, extended in forward-and-downward-inclined direction, of the hand-pushed mower **40** having the engine **6**, the wheel **7** attached to the frame **8**, and the detachable rotation transmitting portion **9** to which rotational driving force of the engine **6'** is transmitted and the mowing blade is detachably attached, is provided, and the snow-removing member **4** is provided with the snowplow rotating body **1** rotated around the horizontal axis L by the rotation transmitting portion **9** for plowing and throwing snow. And, changing work is convenient without much labor because the purpose is changed only by attachment and removal of the mowing blade and the snow-removing member **4** on the rotation transmitting portion **9**. And, purchasing cost can be reduced because machines specialized in mowing and snowplow are not necessary to buy.

And, the apparatus composed of the engine **6** and the wheel **7** can be multi-purpose and effectively used for grass mowing in summer and for snow plowing in winter by replacement of the mowing blade attached to the rotation transmitting portion **9** with the snow-removing member **4** because the snow-plowing apparatus relating to the present invention has a construction in which the engine **6** and the wheel **7** are attached to the frame **8**, the snow-removing member **4**, detachably attached to the end **5***a* of the holding rod **5** extended from the engine **6** in forward-and-downward-inclined direction, and the snow-removing member **4** is provided with the snowplow rotating body **1** rotated around the horizontal axis L for plowing and throwing snow by the rotation transmitting portion **9**, disposed on the end **5***a* of the holding rod **5**, to which rotational driving force of the engine **6** is transmitted. And, changing work is convenient without much labor because the purpose is changed only by attachment and removal of the mowing blade and the snow-removing member **4** on the rotation transmitting portion **9**. And, purchasing cost can be reduced because machines specialized in mowing and snowplow are not necessary to buy.

And, all of the snow-plowing blades **11** of the short rotating bodies **10** do not simultaneously plow the snow S for the difference of timing that the snow-plowing blades **11** of the short rotating bodies **10** approach the snow S because the snow-removing member **4** is provided with the shaft member **2** attached to the rotation transmitting portion **9** and rotated around the horizontal axis L, and the housing member **3** attached to the end **5***a* of the holding rod **5** and disposed near the rear side of the snowplow rotating body **1** to lead the snow plowed by the snowplow rotating body **1** upward, the snowplow rotating body **1** is composed of plural short rotating bodies **10** having the insertion hole **12** to mount to the shaft member **2** and unitedly rotated around the horizontal axis L, and each of the short rotating bodies **10** has the plural snow-plowing blades **11** disposed with a predetermined pitch in the peripheral direction X, and the plural short rotating bodies **10** are mounted to the shaft member **2** to compose the snowplow rotating body **1** as the plural snow-plowing blades **11** are dislocated each other in the peripheral direction X. Therefore, when the short rotating body **10** is divided into three units, for example, the torque which the rotation transmitting portion **9** receives when the snow S is plowed is about ⅓ of a case in which the snow-plowing blades **11** plow the snow S simultaneously with the whole length in the axis direction, and stress on the engine **6** is greatly reduced. Consequently, the snowplow rotating body **1** rotates smoothly, the snow plowing is efficiently conducted, and defects of the engine **6** are reduced.

To make the whole snowplow rotating body **1** as one unit, the mold causes high cost and it is quite difficult to make the mold with high accuracy. The cost of the mold is greatly reduced with high accuracy by dividing the snowplow rotating body **1** into the plural short rotating bodies **10**.

And, snow plowing is smoothly conducted because the snow shoveled by the snow-plowing blades **11** is guided forward and upward and thrown away.

The plural short rotating bodies **10** having the same configuration (provided with the snow-plowing blades **11** with the same distribution) can be mounted on the shaft member **2** as phase of the snow-plowing blades **11** of each short rotating body **10** dislocate in the peripheral direction X because the shaft member **2** has the peripheral face **20** of equilateral hexagon in cross section, and the insertion hole **12** of the short rotating body **10** is formed to be equilateral hexagon to be mounted to the shaft member **2** without gaps. Therefore, for example, three short rotating bodies **10** can be mounted to the shaft member **2** to be dislocate phases each other for 120°. And, production cost can be reduced because a short rotating body **10** having different distribution of the snow-plowing blades **11** is not necessary.

When the mower **40** proceeds, the snow-shoveling portion **33** bites into the snow accumulated on the ground, and the snow is smoothly sent to the snowplow rotating body **1** to plow the snow efficiently because the housing member **3** has the snow-shooting wall portion **31** approximately upward-and-forward-inclined J-shaped in cross section to guide the snow upward, and the snow-shoveling portion **33** formed unitedly with the snow-shooting wall portion **31** along the lower end edge **32** of the snow-shooting wall portion **31**.

The snow can be thrown away in the upward-and-forward-inclined direction to smoothly conduct the snow plowing because the snow shoveled by the snow-plowing blades **11** is guided along the front face of the snow-shooting wall portion **31** of the housing member **3** along with the rotation of the short rotating bodies **10**.

And, the snow-shooting wall portion **31** and the snow-shoveling portion **33** unitedly formed within the housing member **3** do not cause much labor in comparison with a case that separated members are connected with bolts, and have a strong construction without separation by loosening of the bolts in use.

While preferred embodiments of the present invention have been described in this specification, it is to be understood that the invention is illustrative and not restrictive, because various changes are possible within the spirit and indispensable features.

What is claimed is:

1. A snow-plowing apparatus comprising:

a snow-removing member, detachably attached to an end of a holding rod, extended in forward-and-downward direction, of a hand-pushed mower including an engine, a wheel attached to a frame, and a rotation transmitting portion including a gear case and a rotation shaft portion, and being detachably attached to the snow-removing member through an attached disc portion, to which rotational driving force of the engine is transmitted and a mowing blade is detachably attached;

wherein:

the snow-removing member includes a snowplow rotating body rotated around a horizontal axis by the rotation transmitting portion for plowing and throwing snow, and the rotation shaft portion of the rotation transmitting portion is directed vertically when the mowing blade is attached, and directed horizontally when the snow-removing member is attached;

the snow-removing member includes a shaft member that is attached to the rotation transmitting portion and rotated around the horizontal axis, and a housing member attached to the end of the holding rod and disposed near a rear side of the snowplow rotating body to lead the snow plowed by the snowplow rotating body upward;

the snowplow rotating body is divided into plural short rotating bodies along the horizontal axis of the rotating body, each rotating body including a respective insertion hole to mount to the shaft member and thereby to rotate unitedly around the horizontal axis, and each of the short rotating bodies comprises respective plural snow-plowing blades disposed with a predetermined pitch in a peripheral direction; and

wherein the plural short rotating bodies are mounted to the shaft member to compose the snowplow rotating body with the plural snow-plowing blades dislocated relative to each other in the peripheral direction around the horizontal axis;

whereby torque on the shaft member is reduced.

2. The snow-plowing apparatus as set forth in claim **1**, wherein the shaft member has a peripheral face shaped as an equilateral hexagon in cross section, and wherein the insertion hole of the short rotating body is shaped as the equilateral hexagon to be mounted to the shaft member without gaps.

3. The snow-plowing apparatus as set forth in claim **2**, wherein the housing member has a snow-shooting wall portion approximating an upward-and-forward-inclined J-shape in cross section to guide the snow upward, and a snow-shoveling portion formed unitedly with the snow-shooting wall portion along a lower end edge of the snow-shooting wall portion.

4. The snow-plowing apparatus as set forth in claim **1**,

wherein the short rotating bodies number three,

wherein the shaft member has a peripheral face shaped as an equilateral hexagon in cross section, and wherein the insertion hole of the short rotating body is shaped as the equilateral hexagon to be mounted to the shaft member without gaps, and

wherein the snow-plowing blades of the short rotating bodies are dislocated by 120° relative to one another in the peripheral direction.

5. The snow-plowing apparatus as set forth in claim **4**, wherein each of the short rotating bodies comprises four of the snow-plowing blades and the snow-plowing blades are equally-spaced at the predetermined pitch.

6. The snow-plowing apparatus as set forth in claim **5**, wherein a center angle of equal distribution of the snow-plowing blades and a replacement pitch angle of insertion of the shaft member into the insertion hole of the short rotating body are set to be different and in mutual relationship of multiplication by an integer.

7. The snow-plowing apparatus as set forth in claim **1**, wherein a center angle of equal distribution of the snow-plowing blades and a replacement pitch angle of insertion of the shaft member into the insertion hole of the short rotating body are set to be different and in mutual relationship of multiplication by an integer.

8. The snow-plowing apparatus as set forth in claim **1**, wherein the short rotating bodies have a same configuration.

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